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ABSTRACT

The Advanced Technological Education (ATE) program specifically addresses the education of science and engineering technicians. In 1994, the National Science Foundation, through the ATE program, awarded 58 grants to improve the quality of advanced technological education in science and engineering technology fields. This document contains information on the awards that support projects in curriculum and laboratory development, teacher preparation, faculty and teacher enhancement, and planning grants for Centers and a few Centers of Excellence. Section I contains information about the ATE program and fiscal year 1994 awards; a U.S. map of all awards; a listing of awards by technology; and a history of the ATE program. Section II provides abstracts of awards divided into Centers for Excellence, planning grants, and projects in advanced technological education. Section III is an appendix providing an index of awards by state, award maps, and an index of principal investigators. (LZ)

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ADVANCED TECHNOLOGICAL EDUCATION PROGRAM

1994 AWARDS AND ACTIVITIES

ED 380 288

ADVANCED TECHNOLOGICAL EDUCATION

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ADVANCED TECHNOLOGICAL EDUCATION PROGRAM

1994 AWARDS AND ACTIVITIES

ADVANCED TECHNOLOGICAL EDUCATION

DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES
Division of Undergraduate Education
Division of Elementary, Secondary, and Informal Education

January 1995

NATIONAL SCIENCE FOUNDATION

Division of Undergraduate Education

Division of Elementary, Secondary, and Informal Education

The Advanced Technological Education (ATE) Program

FY1994 Awards

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Advanced Technological Education Improved through New NSF Program

The Advanced Technological Education (ATE) program, new at the National Science Foundation (NSF) this year, specifically addresses the education of science and engineering technicians. Dr. Luther Williams, NSF Assistant Director for Education and Human Resources (EHR), says "It has become increasingly apparent that for the United States to be competitive in the world market, the technical component of the work force in the United States must be better prepared than the corresponding work force in other industrialized countries. The Advanced Technological Education (ATE) program is a major new NSF initiative in response to this challenge." The ATE program is managed in the Division of Undergraduate Education (DUE) in cooperation with the Division of Elementary, Secondary, and Informal Education (ESIE).

In 1994 the National Science Foundation, through the ATE program, awarded 58 grants to improve the quality of advanced technological education in science and engineering technology fields, as well as the basic mathematics and science core underlying such programs. These awards, which total about $13.4 million for the first year and $26.9 over three years, support 3 Centers of Excellence, 16 planning grants for Centers of Excellence, and 39 projects that result in reform in technological education.

The goal of the new ATE program is to promote exemplary improvement in advanced technological education at the national and regional level through support of curriculum development and program improvement for technicians being educated for the high performance work place of advanced technologies. Central to the ATE program is the development of strategies to strengthen two-year college technician education and to strengthen the mathematics, science, and technology education base in secondary schools for those planning to enroll in technician education programs in two-year colleges. Expanded opportunities for technicians at four-year colleges and universities and for those employed are also included. Those projects and centers supported through the ATE program will result in major improvements in advanced technological education for science and engineering technicians, build collaborations among academic institutions and between academe and industry, serve as models for other institutions, assure that students acquire strong backgrounds in mathematics and science, and yield nationally-usable educational products.

The ATE program is supporting projects in curriculum and laboratory development, teacher preparation, and faculty and teacher enhancement in addition to the planning grants for Centers and a few Centers of Excellence. Robert Watson, Director of DUE and the official liaison between the Foundation and two-year colleges, says "This program exemplifies NSF's concern for the education of all students. The scientific and technical educational community, along with business, industry, and professional societies has been very interested, excited, and supportive of this new program at NSF. Projects and centers funded will make major reforms in the education of science and engineering technicians in strategic advanced-technology fields."

The projected national impact of the ATE program is large. Each location differs in its resources, population, geography, and industrial and technical needs. The projects represent collaboration of two-year colleges with secondary schools and four-year institutions. Intellectual partnerships with business, industry, and government are featured. All projects demonstrate a leadership role in technician education which includes plans for curriculum, faculty, and teacher development. They will serve as clearinghouses and service centers for reform in the education of science and engineering technicians. According to Margaret Cozzens, Division Director for ESIE, "Mounting a major national effort to improve the education of technicians requires that all groups involved in technician education become proactive. With support from the National Science Foundation and others who share the vision, it will be possible to make a difference in how science and engineering technicians are educated at all levels in this country."

The awards cover a wide range of advanced technological fields including biotechnology, environmental technology, computer technology, chemical technology, manufacturing technology, electronics, biomedical engineering technology, geographic information systems technology, instrumentation and calibration technologies as well as the mathematics, physics, chemistry, biology, and other core courses which serve to undergird such programs. For example:

- The Environmental Education Technology Center, which is a joint effort of Eastern Iowa Community College, Kirkwood Community College, Hazardous Materials Training and Research Institute (HMTRI), and Partners for Environmental Education (PETE), involves over 300 community colleges in their dissemination efforts. They estimate that in the first 3 years of their award, they will directly impact 300 community college teachers, 300 pre-college teachers, and 5500 students. As a secondary effect, each of the 600 teachers is expected to teach an average of 100 students per year in environmental programs or literacy programs which gives the projected impact around 60,000 students during the award period. The Center is developing nationally validated curriculum models and instructional materials; establishing comprehensive programs of professional development; serving as a clearinghouse for environmental education information; and acting as a hub for the networking of environmental educators, business and industry, federal agencies, and professional societies.

- The Advanced Manufacturing Center is a joint effort of Sinclair Community College, the University of Dayton, local industries, and secondary schools. The Center also involves community colleges in three other states in the development stage with significant other two-year college involvement planned for the beta testing stages. The Center is acting as catalyst to improve science, mathematics, and advanced manufacturing instruction by developing an advanced manufacturing curriculum beginning in grade 11 through the associate degree program, and culminating in a bachelor's degree; writing, pilot testing, and publishing curriculum materials; and disseminating the curriculum, instructional materials, and model program nationally. The Center is housed in a state-of-the-art building on the Sinclair campus.

- The distance education consortium led by Texas Technical College in Sweetwater involves many institutions in Texas, New Mexico, and Oklahoma. The project is developing the infrastructure and pedagogy to deliver technical courses through distance learning. These include existing courses in CAD/CAM/CIM as well as new AAS programs in polymer technology and electro-mechanical technology to complement needs of local industry.

NSF selected the sixteen planning grants for centers because of their their strong individual potential to become Centers, and because they offer a rich diversity of approaches to comprehensive changes in advanced technological education. The 16 planning grants for centers are in 14 different states. The states with two planning grants are California, which enrolls 25% of the country's two-year college students, and Texas. Even though the planning grants are centered in 14 states, 20 states are represented among the coalitions. The Planning Grant for a Center in Aerospace Engineering at Brevard Community College in Florida has community colleges in Alabama, Virginia, Maryland, Ohio, Texas, Mississippi, and California as partners. In addition, many of the projects have significant outreach to institutions in other states. For example, the planning grant for a Center in Chemical Technology Education in Nebraska currently has outreach to institutions in at least 16 other states.

The 20 largest projects are all curriculum development projects which plan to develop and test curriculum nationwide, although most also have a significant faculty enhancement component involved.

- A consortium composed of 15 community colleges in Kentucky plus the University of Kentucky and the Kentucky Tech Prep programs is developing a project to significantly effect both the mathematics and computer science core of the technology programs in Kentucky as well as create a new associate degree program in telecommunications. The project is reforming the mathematics and calculus curriculum which undergirds the programs for technicians, developing an associate degree program in telecommunications and computer management, networking the community colleges, and providing significant faculty development activities.

- The Miami University Middletown project is affecting 600 pre-college teachers and college faculty in faculty enhancement workshops and 20 in curriculum development efforts. Assuming each teacher or faculty member directly impact 100 chemistry or chemical technicians students per year, this will result in 60,000 students being ultimately impacted by the project. Activities include curriculum development, instructional materials development, faculty and teacher enhancement, and student enhancement, and outreach. An industrial internship program for high school and college teachers is an important component.

- Mesa State College, Navajo Community College, and Northern New Mexico Community College in cooperation with other tribal and tribally related colleges are creating an interdisciplinary environmental technology degree program. The project is also providing faculty enhancement, instructional materials, and a rotating equipment program.

1994 ATE Awards—58 Proposals were awarded: 3 Centers; 16 Planning Grants; 39 Projects

Centers (C) Planning Grants for Centers (P) Model Projects (M)

Numbered Map of all 1994 ATE Awards

1. Portland Community College
2. Mt. Hood Community College
3. Chemeketa Community College
4. California State Univ.–Hayward
5. Peralta Community College
6. Intelecom
7. Montgomery Peninsula Comm. Coll.
8. West Valley College
9. MiraCosta Community College
10. Eastern Idaho Community College
11. Maricopa Community College
12. Center for Image Processing
13. Mesa College
14. New Mexico Inst. Mining/Tech.
15. Texas State Technical College
16. Alvin Community College
17. Austin Community College
18. Amarillo Community College
19. San Antonio College
20. Houston Community College
21. Houston Community College
22. Consort. for Adv. Manufacturing
23. Kansas State Univ.–Salina
24. Southeast Community College
25. Iowa State University
26. Eastern Iowa Community College
27. Madison Area Technical College
28. Wayne State University
29. Henry Ford Community College
30. Henry Ford Community College
31. Sinclair Community College
32. Miami University–Middletown
33. Kentucky Community College System
34. Chattanooga State Technical College
35. AMATYC
36. Tri-County Technical College
37. Piedmont Community College
38. Brevard Community College
39. University of Hawaii–Maui
40. Wytheville Community College
41. Montgomery County Community College
42. ITEA
43. Old Dominion
44. American Chemical Society
45. Montgomery College
46. Penn State University
47. Middlesex Community College
48. Middlesex Community College
49. NY Technical College
50. CUNY Queensborough
51. Camden County College
52. Middlesex County College
53. Minuteman Voc. Tech. School
54. Concord Consortium
55. New Hampshire Technical College
56. Minnesota Riverland
57. Huertas Junior College
58. AACC

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Type of Technology	State	Award	First Year Award Length	First Year Award ATE	First Year Award Other	Total Award ATE	Total Award Overall
AEROSPACE TECHNOLOGY							
Brevard Community College	FL	PL	1	$50.0	$0.0	$50.0	$50.0
Old Dominion–Virginia Space Consort.	VA	PL	1	$49.8	$0.0	$49.8	$49.8
subtotals				$99.8	$0.0	$99.8	$99.8
BIOTECHNOLOGY							
California State University–Hayward	CA	PR	3	$250.0	$0.0	$250.0	$250.0
Mira Costa Community College	CA	PL	1	$48.6	$0.0	$48.6	$48.6
Peralta Community College	CA	PR	3	$209.0	$0.0	$209.0	$209.0
Middlesex Community College	MA	PR	3	$348.0	$0.0	$1,132.0	$1,132.0
Madison Area Technical College	WI	PR	3	$400.0	$0.0	$1,000.0	$1,000.0
New Hampshire Technical College	NH	PR	2	$30.0	(ILI) $50.0	$30.0	$80.0
subtotals				$1,285.6	$50.0	$2,669.6	$2,719.6
CHEMICAL TECHNOLOGY							
Southeast Community College	NE	PL	1	$50.0	$0.0	$50.0	$50.0
American Chemical Society	DC	PR	3	$500.0	$0.0	$1,500.0	$1,500.0
Eastern Idaho Community College	ID	PR	2	$38.5	(ILI) $38.5	$38.5	$77.0
Miami University–Middletown	OH	PR	3	$400.0	$0.0	$1,200.0	$1,200.0
subtotals				$988.5	$38.5	$2,788.5	$2,827.0
COMPUTER TECHNOLOGY							
Maui Community College–U. of Hawaii	HI	PR	3	$499.9	$0.0	$499.9	$499.9
Center for Image Processing	AZ	PR	3	$403.8	$0.0	$1,347.0	$1,347.0
Minnesota Riverland Community College	MN	PR	2	$271.8	$0.0	$500.0	$500.0
subtotals				$1,175.5	$0.0	$2,346.9	$2,346.9
CORE AND ONE OR MORE SPECIFIC TECHNOLOGIES							
Montgomery Community College	MD	PL	1	$50.0	$0.0	$50.0	$50.0
Middlesex County College	NJ	PL	1	$50.0	$0.0	$50.0	$50.0
Austin Community College	TX	PL	1	$48.4	$0.0	$48.4	$48.4
New York Technical College	NY	PL	1	$50.0	$0.0	$50.0	$50.0
Wayne State College	MI	PL	1	$50.0	$0.0	$50.0	$50.0
Maricopa Community College	AZ	PL	1	$50.0	$0.0	$50.0	$50.0
Iowa State University	IA	PL	1	$50.0	$0.0	$50.0	$50.0
San Antonio College	TX	PL	2	$50.0	$0.0	$50.0	$50.0
Texas State Technical College	TX	CE	3	$465.9	(ILI) $68.0	$1,612.0	$1,680.0
Amarillo College	TX	PR	3	$630.0	$0.0	$630.0	$630.0
TriCounty Technical College	SC	PL	1	$50.0	$0.0	$50.0	$50.0
Chattanooga State Technical College	TN	PL	1	$50.0	$0.0	$50.0	$50.0
West Valley College	CA	PR	3	$300.0	$0.0	$300.0	$300.0
International Technological Education Assn.	VA	PR	2	$75.0	(IMD) $425.0	$75.0	$500.0
Minuteman Vocational School	MA	PR	3	$185.7	$0.0	$185.7	$185.7
subtotals				$2,155.0	$493.0	$3,301.1	$3,794.1
SPECIAL							
American Association of Community Colleges	DC	PR	1	$19.0	$0.0	$19.0	$19.0
subtotals				$19.0	$0.0	$19.0	$19.0

Key: **PL**= Planning Grant, **PR** = Project, **CE** = Center, **ILI** = (Instrumentation and Laboratory Improvement), **CCD** = (Course and Curriculum Development), **IMD** = (Instructional Materials Development), **CC** = Community College

Type of Technology	State	Award	First Year Award Length	First Year Award ATE	Total Award Other	Total Award ATE	Total Award Overall
ELECTRONICS							
Houston Community College	TX	PR	1	$50.0	$0.0	$50.0	$50.0
Camden Community College	NJ	PR	2	$130.0	$30.0	$130.0	$160.0
Alvin Community College	TX	PR	2	$247.8	$0.0	$247.8	$247.8
Portland Community College	OR	PR	2	$100.0	$0.0	$200.0	$200.0
Queensborough Community College	NY	PR	3	$197.0	$0.0	$500.0	$500.0
subtotals				$724.8	$30.0	$1,127.8	$1,157.8
ENGINEERING TECHNOLOGY							
Piedmont Community College	SC	PR	2	$123.9	$0.0	$123.9	$123.9
Montgomery County Community College	PA	PR	2	$58.6	(ILI) $58.6	$117.2	$175.8
Huertas Junior College	PR	PR	2	$50.0	$0.0	$50.0	$50.0
subtotals				$232.5	$58.6	$291.1	$349.7
ENVIRONMENTAL TECHNOLOGY							
Chemeketa Community College	WA	PL	1	$47.5	$0.0	$47.5	$47.5
Eastern Iowa Community College	IA	CE	3	$999.6	$0.0	$2,999.1	$2,999.1
Intelecom	CA	PR	3	$500.0	$0.0	$1,500.0	$1,500.0
Mesa State College	CO	PR	3	$400.0	$0.0	$400.0	$400.0
Monterey Peninsula Unified School District	CA	PL	1	$50.0	$0.0	$50.0	$50.0
subtotals				$1,997.1	$0.0	$4,996.6	$4,996.6
GEOGRAPHICAL INFORMATION SYSTEMS							
Kansas State University at Salina	KS	PR	3	$500.0	$0.0	$500.0	$500.0
subtotals				$500.0	$0.0	$500.0	$500.0
MANUFACTURING							
Sinclair Community College	OH	CE	3	$1,000.0	$0.0	$3,000.0	$3,000.0
Houston Community College	TX	PR	2	$304.0	$0.0	$604.0	$604.0
Wytheville Community College	VA	PR	2	$197.9	$0.0	$197.9	$197.9
Penn State University–University Park	PA	PR	2	$282.0	$0.0	$658.0	$658.0
CAM-I: Consort. for Adv. Manuf.–Int'l	TX	PR	3	$500.0	$0.0	$1,500.0	$1,500.0
subtotals				$2,283.9	$0.0	$5,959.9	$5,959.9
MATHEMATICS							
Mt. Hood Community College	WA	PR	3	$469.9	$0.0	$469.9	$469.9
Middlesex County College	NJ	PR	2	$169.8	$0.0	$169.8	$169.8
Kentucky Community College System	KY	PR	3	$696.3	(ILI) $104.0	$696.3	$800.3
AMATYC	TN	PR	1	$10.2	$0.0	$10.2	$10.2
Henry Ford Community College	MI	PR	2	$10.0	(ILI) $10.0	$10.0	$20.0
New Mexico Institute for Mining Technology	NM	PR	2	$25.2	(CCD) $24.8	$25.2	$50.0
subtotals				$1,381.4	$138.8	$1,381.4	$1,520.2
PHYSICS							
Concord Consortium	MA	PR	3	$432.7	$0.0	$432.7	$432.7
Henry Ford Community College	MI	PR	2	$129.7	$0.0	$129.7	$129.7
subtotals				$562.4	$0.0	$562.4	$562.4
(All amounts are in $1,000's)	**Grand Total**			**$13,405.5**	**$808.9**	**$26,044.1**	**$26,853.0**

Key: **PL**= Planning Grant, **PR** = Project, **CE** = Center, **ILI** = (Instrumentation and Laboratory Improvement), **CCD** = (Course and Curriculum Development), **IMD** = (Instructional Materials Development), **CC** = Community College

History of the ATE Programs: Important Dates

December 1992	Science and Advanced Technology Act (SATA) passes Congress and signed by president which authorizes NSF to create the ATE program
Spring 1993	NSF prepares preliminary plans for ATE NSF preliminary Outreach to community on ATE
Summer 1993	ATE program preparation
July 21–23, 1993	NSF in cooperation with the American Chemical Society (ACS) and the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET) hosts a national leadership workshop on critical issues in science and engineering technician education
August 12, 1993	ATE program receives National Science Board (NSB) approval
August 23, 1993	ATE program announcement appears on STIS and in the Federal Register
September 8, 1993	ATE program announcement (NSF 93–132) mailed
November 1, 1993	Preliminary Proposals and Planning Grants 1 due
December 2–3, 1993	ATE Preliminary Proposal Review Panels for FY94
Late December, 1993 – Early January, 1994	Responses to Preliminary Proposals Mailed
January–March, 1994	Six ATE planning grants awarded
March 22, 1994	First Formal ATE proposals deadline
April 1994	Press Release on first ATE planning grant awards
May 12–14, 1994	ATE panel review for formal proposals
May 1994	Workshop report *Gaining the Competitive Edge: Critical Issues in Science and Engineering Technician Education* (NSF 94–32) publication becomes available and is mailed to community
Spring, Summer, Fall 1994	Outreach workshops on ATE sponsored with the American Association of Community Colleges (AACC) and various professional societies
June 1994	Site visits to highly competitive center proposals
Summer 1994	Awards for 3 Centers, 10 more planning grants for Centers, and 39 projects

July 1994	Publication *Activities in Support of Two-Year College Science, Engineering, Technology, and Mathematics Education: Fiscal Year 1993 Highlights* (NSF 94–86) becomes available and is mailed to community
July 28, 1994	Preliminary proposals for FY95 ATE program due
August, September 1994	Awards for the ATE projects, centers, and planning grants made
September 23–24, 1994	Panel for FY95 ATE Preliminary Proposals
October 27–29, 1994	ATE Principal Investigators Conference for Centers, Planning Grants for Centers, and selected large projects plus a Preconference Leadership Workshop involving industrial and educational leaders
October 1994	Responses to FY95 preliminary proposals sent
January 26, 1995	Formal ATE proposals for FY95 due
March 16–18, 1995	Review Panel for FY95 ATE formal proposals
August 3, 1995	Preliminary ATE Proposals for FY96 due
February 1, 1996	Formal ATE proposals for FY96 due

CENTERS

Title: Advanced Technology Environmental Education Center (ATEEC)

Ellen Kabat DUE 9454638
Hazardous Materials Training
and Research Center
Cedar Rapids, IA 52406
FY1994 $ 999,961
FY1995 $ 999,907
FY1996 $ 999,998
Advanced Technology Education

There is a rapidly growing need for advanced technology environmental education programs to prepare students for the workplace of today and tomorrow. To build a high performance environmental education infrastructure, the Hazardous Materials Training and Research Institute (HMTRI), the Partnership for Environmental Technology Education (PETE), and the University of Northern Iowa Center for Environmental and Energy Education is establishing a national Advanced Technology Environmental Education Center (ATEEC). The vision is to create a world class network of community college environmental programs linked with secondary schools that inform and prepare students for entry into these two-year programs. The Center has established three broad goals: (1) Develop nationally validated curriculum models and advanced instructional materials; (2) Establish comprehensive programs of professional development; and (3) Build a clearinghouse to serve as a national center of environmental information and as a hub for the networking of environmental educators, business and industry, federal agencies, and professional societies. The Center is providing leadership to: enhance core and advanced mathematics and science and technology components of environmental education; utilize advanced electronic communications networks; focus upon meeting the needs of diverse learners; encourage instructional materials which utilize advanced technologies; and develop teaching and curriculum standards for environmental education. ATEEC is enhancing hundreds of faculty and teachers and improving the education of thousands of students throughout the nation.

Title: National Center of Excellence for Advanced Manufacturing Education (NCE/AME)

David T. Harrison DUE 9454571
Sinclair Community College
Dayton, OH 45402
FY1994 $ 1,000,000
FY1995 $ 1,000,000
FY1996 $ 1,000,000
Advanced Technological Education

The Advanced Integrated Manufacturing Center is a joint effort between Sinclair Community College and the University of Dayton to create a National Center of Excellence for Advanced Manufacturing Education (NCE/AME). The goal of the Advanced Integrated Manufacturing Center, located on the campus of Sinclair Community College, is to redesign the infrastructure of technological education in manufacturing. The NCE/AME will be a catalyst for educational change to improve science, mathematics, and advanced manufacturing instruction at secondary school, community college, and university levels. The program is accomplishing the following objectives:

1. Developing a new competency-based, occupationally verified, seamless curriculum beginning in grade 11, through the Associate of Applied Science degree, culminating with the Bachelor of Science degree using advanced manufacturing as the focus; with gateways to and from industrial employment throughout.

2. Writing, pilot testing, and publishing curriculum materials (laboratory manuals, video, software, and other ancillary materials) to improve mathematics, science, and manufacturing engineering technology instruction.

3. Disseminating the curriculum, curriculum materials, and model program nationally.

Title: Southwest Center for Advanced Technological Education

Robert L. Musgrove DUE 9454643
Texas State Tech Inst. Sweetwater
Sweetwater, TX 79556
FY1994 $ 565,872 ATE : $ 465,872
FY1995 $ 585,290 ILI : $ 100,000
FY1996 $ 560,475
Advanced Technological Education

The Southwest Regional Center for Advanced Technological Education is a collaboration among two-year colleges, four-year colleges and universities, industries, and Tech Prep consortia in West Central Texas, New Mexico, and Oklahoma to provide technical education in a vast rural region through distance education. The project is developing the infrastructure and the pedagogy to deliver many technical courses through distance learning. These include existing courses in CAD/CAM/CIM which are being converted for delivery via distance learning to two-year institutions and secondary school sites. Faculty at two-year colleges are working with the Department of Education at Texas Technical College to develop new instructional materials. In particular, the Center is developing new AAS programs in polymer technology and electromechanical technology to complement needs of industry in the area.

Through an intensive effort at developing distance education and electronic networking in the consortium, the Center is enabling the member institutions to share their substantial resources, to deliver quality instruction throughout the area, and to exchange data and information rapidly and efficiently. This "center without walls" addresses the intertwined problems—distance, expense, and limited resources—inherent in delivering advanced technological education in such a large region. Its findings, strategies, tactics, materials, and methodologies constitute a significant contribution to technical education in the nation.

PLANNING GRANTS

Title: Maricopa Advanced Technological Education Center (MATEC)

Alfredo G. de los Santos DUE 9454545
Maricopa County Community College District
Tempe, AZ 85281
FY1994 $ 49,993
Advanced Technological Education

The Maricopa Advanced Technological Education Center (MATEC) Planning Project is planning for a Center to be operated by the Maricopa County Community College District, Phoenix, Arizona, in collaboration with other educational and business/industry partners. The planning process involves representatives from three educational levels (secondary school, community college, and university) and industry partners who are stakeholders in implementing new educational approaches which prepare students for the high performance workplace. Planning assumptions, based on an environmental theme, provide the framework for a collaborative Steering Committee to develop the vision/mission and strategies for MATEC. Faculty teams, with members from the various educational levels and support from business/industry representatives, are developing the Operational Plan. Emphasis is on approaches which integrate the teaching/learning of academic concepts in science, mathematics, and technology with the development of workplace competencies, including the skills/abilities necessary for continuous learning/adaptation after entry into the workplace. The overall goal is to implement MATEC which will serve as a national model and clearinghouse for secondary/postsecondary Advanced Technological Education.

Title: Planning Grant for an Advanced Biotechnology Education Center

Leslie J. Snider DUE 9454512
Mira Costa College
Oceanside, CA 92056
FY1994 $ 48,564
Advanced Technological Education

The planning for the Advanced Biotechnology Education Center represents a collaborative effort between California Community Colleges, the California State University system, the University of California system, national laboratories, California secondary school districts and biotechnology industries. Providing 50% of the biotechnology industry and 17% of higher education opportunities, California recognizes the imperative to plan a Center that addresses the needs of industry and the needs for basic science education and science literacy.

This project is developing a complete and comprehensive plan to target needs for all students in biotechnology and basic science courses, especially those from underrepresented populations, and provide a national model for curriculum improvement and development at each stage in the educational/occupational continuum in biotechnology. California Biotechnology Consortium membership and a Center Steering Committee is providing leadership for planning curriculum, faculty enhancement, equipment needs, evaluation and dissemination. Five leaders in education have been selected for the roles of lead principal investigator and co-principal investigators. Conferences, electronic networking and teleconferences provide the means to develop written reports and a detailed plan for an Advanced Biotechnology Education Center.

Title: Monterey Advanced Technological Education (MATE)

Kam Matray DUE 9454567
Monterey Peninsula Unified School District
Monterey, CA 93942
FY1994 $ 50,000
Advanced Technological Education

Project Monterey Advanced Technological Education Education (MATE) is uniting educational institutions (from secondary-school to college) and cooperating science-related agencies in a consortium to design a marine, environmental, and global change ATE Center at Monterey Bay, CA. The goal of providing better educated science and engineering technicians is made possible through the proposed alliance of local institutions and scientific agencies that surround Monterey Bay. These human and technological resources, aligned with the unique bioresources of Monterey Bay, provide for the development of an articulated, technologically enhanced and thematic environmental science education program which includes curriculum, instructional strategies, and products serving as a model for replication and national dissemination. Project MATE is providing for a program formulation session in order to identify courses, products, technology, and resources to be merged, aligned, designed, and developed for the planned ATE Center. MATE is producing a blueprint for systemic change relative to the new articulated curriculum and instruction utilizing the resources of the environment, scientific, industrial and business communities of the Monterey Bay area. This project is planning to implement a nationwide model for a technologically enhanced and articulated marine, environmental and global change science instructional program.

Title: National Center for Excellence in Advanced Technological Education Presented by Community College for Innovative Technology Transfer (CCITT)

Maxwell C. King DUE 9454637
Brevard Community College
Cocoa, FL 32922
FY1994 $ 50,000
Advanced Technological Education

CCITT is a national consortium of twelve community colleges who are planning for a National Center of Excellence in Advanced Technological Education Education. Consortium members are: Brevard Community College, FL; Cuyahoga Community College, OH; Foothill College, CA; John C. Calhoun College, AL; Pasadena City College, CA; Pearl River College, MS; Prince George's Community College, MD; Thomas Nelson Community College, VA; and Houston, TX-based Consortium Members San Jacinto Community College, College of the Mainland, Alvin College, and Lee College. These twelve community colleges are linked through their involvement with, and long-term specialized instructional support for nine NASA Field Centers. Linkages are established with area universities and school systems to maximize articulation of technological education programs.

The Center is developing plans to establish a national clearinghouse for curricular and faculty development programs as well as educational media supporting these programs to infuse science and mathematics into technological education programs. Curriculum design, faculty enhancement, outreach services, media development and product dissemination activities are being designed to enhance the quality of advanced technological education programs at community colleges and technical institutions nationwide. An advanced national telecommunications and bulletin board delivery system is being established to facilitate cost-effective sharing of information among faculty on a national basis, and to support creative models for distance learning.

Title: North Central Center for Advanced Engineering Technology Education (NDE/NDT)

David K. Holger DUE 9454606
Iowa State University
Ames, IA 50011
FY1994 $ 50,000
Advanced Technological Education

Two high-priority national issues require a combination of new technological and educational solutions: improving national competitiveness and productivity and dealing with an aging infrastructure. A key element in addressing both issues is a well-developed continuum of educational and training opportunities that foster collaboration, interaction, and transfer of ideas and technology among all sectors of education, industry, and government. A regional center to improve technological education and to foster improved relationships, communication, cooperation, and interaction among the various sectors of nondestructive evaluation/nondestructive testing (NDE/NDT) education and technology and their constituencies in the north central United States is being planned. An informal consortium of Iowa State University (Ames), Hutchinson Technical College (Hutchinson, Minnesota), Moraine Valley Community College (Palos Hills, Illinois), Northeast Iowa Community College (Peosta), and Southeast Community College (Milford, Nebraska) in collaboration with industry, government, professional society, and regional secondary school partners is involved in this planning initiative. To provide a model for a well-articulated continuum of educational opportunities in areas of emerging technological importance, the proposed center is designed to build upon the established research accomplishments of the mature Center for NDE and College of Engineering at Iowa State University, some of the leading technical and community college programs in NDT/NDE in the United States, and selected existing educational development and technology transfer efforts. Programs that provide motivational materials, instructional modules, curriculum materials, workshops, and shared learning environments among students and faculty at all levels from junior secondary school through undergraduate engineering programs are being planned.

Title: Mid-Atlantic Center for Advanced Technological Education

O. Robert Brown DUE 9453250
Montgomery College
Takoma Park, MD 20912
FY1994 $ 50,000
Advanced Technological Education

The work during the planning year is the preparation of a comprehensive proposal detailing the establishment and operation of a regional center for developing, promoting and maintaining excellence in advanced technological education. The Mid-Atlantic Center for Advanced Technological Education (MCATE) includes design input from major regional and local leaders in business, government and education. The plan delineates a modern center where leaders and innovators in technological education assemble to devote their combined talents to creating new academic models, enhancing partnerships, testing new prototypes, researching and sharing results to transform technological education in the Mid-Atlantic region. The senior personnel, supported by additional college resources, are determining appropriate MCATE activities to provide the development of new curricula, improvement of faculty competence, and provision for a clearinghouse for information, methods and materials affecting technological education, starting with student development plus expanded opportunities and experiences. Activities build upon and develop partnerships with leaders from public and private schools, colleges and universities, business, industry, and government agencies. The standard for the determination of the center's activities is the ultimate impact upon the education of students in the region as they select and prepare for careers in science and engineering technologies.

Title: Planning Grant for the Southeast Michigan Alliance for Reinvestment in Technological Education Center (SMARTE)

Mulchand S. Rathod DUE 9454660
Wayne State University
Detroit, MI 48202
FY1994 $ 50,000
Advanced Technological Education

The Southeast Michigan Alliance for Reinvestment in Technological Education (SMARTE) is planning for Center of Excellence to develop a comprehensive "blue print" of a regional advanced technological education center. The project brings together a diverse team consisting of faculty, teachers, and staff members of a major state university, community colleges, and public school systems, and regional business, industry, and labor partners.

The seven objectives are: (a) assess the feasibility of establishing educational standards on a regional basis, (b) explore assessment models, (c) identify models of integration of mathematics and science for technological education, (d) explore model curricula that integrate other competencies such as problem-solving, systems thinking, communications and work habits; (e) Evaluate the feasibility and effectiveness of distance learning and alternative methods. (f) Define the professional development needs of the faculty and teachers, and (g) Define how community college faculty and secondary school teachers partner with business, industry, labor and community organizations to design curriculum modules and methodology that serve the needs of all partners.

Title: A Center of Excellence for Chemistry-Based Technician Education

John V. Kenkel DUE 9453243
Southeast Community College
Lincoln, NE 68520
FY1994 $ 49,983
Advanced Technological Education

The planning grant activity, under the leadership of Southeast Community College, has formed a working group of educators and industrial scientists from schools and companies throughout the United States who wish to create a National Center of Excellence (NCE) for Chemistry-Based Technology Education. The NCE, to be based at Southeast Community College in Lincoln, Nebraska, is preparing to be a national model for program and materials development, and serves as a clearinghouse for information critical to chemistry-based technician education. Among the issues to be tackled when the NCE begins operation are curriculum reform and development, encouraging 2+2+2 articulation agreements, building alliances with industry, direct transfer of credit to four-year institutions and utilization of the most modern interactive technologies to help students, teachers and parents learn the vital importance to society of chemistry-based technicians. The working group members reflect the diversity of the 'chem-tech' community, with members of many disciplines and social backgrounds. The Consortium is a reflection of what the NCE is becoming: a coalition, with people of many backgrounds, striving to be a creative catalyst for a diverse national population who needs to know about chemical technology.

Title: New Jersey Consortium for Advanced Technological Education Planning Projects

John Bakum DUE 9453258
Middlesex County College
Edison, NJ 08818
FY1994 $ 49,96
Advanced Technological Education

A consortium led by Middlesex County College and including Mercer County College, County College of Morris, Raritan Valley Community College and the New Jersey Institute of Technology (NJIT) is planning Center for Excellence in advanced technological education. The Consortium is developing a five-year plan for the Center.

The specific activities to be undertaken by the proposed center are being determined during the planning process, however, many of the following activities are to be included: 1) establishment of communication channels with the research community, both public and private, to identify pertinent emerging technologies; 2) facilitation of the involvement of business and industry and government in identifying emerging technologies likely to effect the economy of the region, 3) development of curricula and/or courses in mathematics, science and technology, 4) production of instructional materials, including laboratory manuals, software and videos; 5) identification of activities and instructional approaches that encourage student learning and enhance learning opportunities for women, minorities and persons with disabilities; 6) provision of professional development opportunities for college faculty and secondary school teachers; and 7) establishment of a mechanism for articulation of courses and programs among secondary schools, two-year colleges and four-year colleges and universities.

The planning structure includes three levels of inter-related committees to ensure both the widest possible scope of consultation with all sectors and a clear line of responsibility for the planning effort. The larger NJCATE planning committee will bring in other educational sectors, government and business and industry and is broad in both representation and focus.

Title: Planning Grant for a National Center of Excellence for Advanced Technological Education

Charles W. Merideth DUE 9453260
CUNY NYC Technical College
Brooklyn, NY 11201
FY1994 $ 50,000
Advanced Technological Education

A New York City consortium consisting of select CUNY associate degree-granting colleges and institutions which award both associate and baccalaureate degrees, the New York City board of Education, and other public and private sector partners is developing a National Center for Excellence in Advanced Technical Education (ATE). Over the next year, the consortium is working with experts and enabling organizations, both within New York City and nationally, to refine the scope and activities of the Center within the New York context. That context presents special opportunities in terms of ensuring access to ATE for women and minority populations as well as persons with disabilities and LEP students. It also offers a high concentration of businesses, foundations, and government agencies as potential partners. The Center's goals are: to establish a stronger national presence for ATE in the region and nation, to develop innovative ATE collaborations with business and industry in order to respond more effectively to technological workplace needs, and to take leadership in the development of ATE curricula, program improvement, and model student support programs. The planning period is helping establish Center governance and management procedures and refining the Center's three-year implementation plan. The proposed Center will:

1) Create an ATE National Clearinghouse which will conduct research, sponsor conferences and develop regional/national telecommunications links among NSF/ATE Centers and the entire ATE educational community. Specific objectives include; identifying target audiences for exemplary ATE materials; determining how to handle the receipt of information, its evaluation, storage and means of dissemination; inves-

tigating linkages to other national clearinghouses or professional holdings.

2) Establish criteria for the selection of exemplary ATE curricula to be produced in multimedia formats and disseminated through the Center. Specific objectives include: promoting development of exemplary curricula in multimedia formats that allow for the continued infusion of new technology; identifying dynamic industrial delivery methods that enhance student mastery of technical skills, facilitate curriculum development and assist faculty development; sponsoring activities that will ensure the widespread dissemination of exemplary curricula and instructional methods; ensuring that students receive needed support services to succeed in ATE associate degree programs.

3) Identify or create model ATE teacher and faculty enhancement activities and devise non-traditional approaches to in-service education. Specific objectives include: concentration on the role of associate degree faculty and innovative ways for professional training, enhancement, recruitment and deployment; promoting and enhancing dialogues between public school teachers and college faculty; promoting and enhancing dialogues between associate degree ATE faculty and business and industry partners to improve teaching.

4) Form a model business and industry collaborative providing leadership at every level of Center activities: defining the technical skill set and fundamental educational underpinnings for engineering technology career paths; developing models for internships, apprenticeships, cooperative education, industry training and corporate staff development for workplace preparedness and ongoing life-long learning; creating models for business / industry collaboration in applied research, shared utilization of labs and Advanced Technological Education resources, and technology support (equipment, installation, training, maintenance and utilization); identifying models for auxiliary activities which provide technology support to industry and business, and staff development and student internships (through technology applications) to education; institutionalizing business and industry participation/collaboration for ongoing support of ATE activities.

Other organizations already committed to working with the Center include the Educational Development Center (EDC), the National Center for research in Vocational Education, IBM, NYNEX, Columbia University's Institute for Education and the Economy, New York Multimedia, and Corning. The Center will build on the improved preparation of students graduating from the New York City public schools in the MST areas.

Title: Northwest Regional Center for Sustainable Resources

Wynn W. Cudmore DUE 9453262
Chemeketa Community College
Salem, OR 97309
FY1994 $ 47,520
Advanced Technological Education

The Northwest Regional Center for Sustainable Resources (NWRCSR) project is a collaborative effort of secondary schools, community colleges, other institutions of higher education, private industry and government in Oregon, Washington and Northern California, to create a comprehensive center of innovative educational programs which can support the efforts of government agencies, industry and business, to restore and preserve the environment. Program graduates enter employment as advanced technicians in a variety of science-based occupations targeting, sustaining and restoring natural resources or continue for advanced degrees. Associate degree programs in diverse natural resource/environmental fields are being created or are undergoing major curricular revisions to focus on aquatic/terrestrial ecosystems. A consortium of community colleges forms the "lead institutions" to develop improved curriculum in forestry, fisheries and wildlife,

water resources, agriculture, environmental assessment, biotechnology and energy management, a partnership which will unifies the program focus in natural resources technologies. Within the consortium, other community colleges provide replication sites to test the transportability of the models. Secondary schools, colleges and universities complete the conduit that is providing a seamless delivery of basic scientific content, principles and processes culminating with hands-on applications.

Internships in industries and agencies are providing additional support to produce a workforce capable of contributing to a unified approach for habitat restoration and assessment. Innovative programs in biotechnology and energy management are being developed in a region where industry itself is driving the programs. The Center's programs provide innovative, transportable models for developing problem solving, communication and collaborative skills that match the requirements of an advanced scientific/technological workforce necessary to transform the workplace to high performance.

In a region where declining Pacific salmon runs and old-growth forest debates have reached national attention, the NWRCSR is an especially timely effort. Prevailing laws and past mismanagement of natural resources are forcing natural resource-based management, environmental cleanup, habitat restoration, watershed assessment and restoration and more sustainable methods for management of fisheries and wildlife, forests and agriculture. The NWRCSR is providing a model for collaborative efforts to address urgent regional needs.

Title: South Carolina Center of Excellence in Advanced Technological Education

James C. Wood DUE 9454654
Tri-County Technical College
Pendleton, SC 29670
FY1994 $ 50,000
Advanced Technological Education

The South Carolina Technical and Comprehensive Education College System is planning for the development of the South Carolina Center of Excellence for Advanced Technological Education. The purpose of the Center is to provide leadership toward reform for the state, the south, and the nation in meeting the challenges of achieving success in today's high-technology marketplace, specifically in the areas of advanced science and engineering technology education. The planning objectives are to design systemic approaches for transforming technological education at the two-year college level including the following five major components: (1) Teaching/Learning Reform; (2) Instructional Technology use; (3) Faculty Development; (4) Collaboration among types of institutions; and (5) Accountability and Dissemination.

Partners include all the two-year colleges in the state of South Carolina, Clemson University, the South Carolina Department of Education, the Academy for Education Development, the South Carolina State Systemic Initiative, the South Carolina Tech Prep Consortium, and numerous representatives from business and industry.

Title: Planning a Center for the Advancement of Emerging Technology Applications

James L. Barrott DUE 9454648
Chattanooga State Technical Community College
Chattanooga, TN 37406
FY1994 $ 50,000
Advanced Technological Education

The grant, "Planning a Center for Advancement of Emerging Technology Applications," presents a plan by six coalition two-year technical colleges in Tennessee to develop a Center in Tennessee that will serve as a national model. Research is presented which demonstrates the importance of coalition building and the need for a timely linkage to take the information sharing from those engaged in development of new technologies and their applications to the companies that can actually put the applications into practice. The goal of the proposed planning grant is to prepare a plan that lays the groundwork for a Center that will function as a clearinghouse. Through this clearinghouse, infor-

mation will be shared statewide and nationally through conferences, Internet communication and published materials, so that colleges and universities can provide education for graduates going into technology fields.

The proposed center will serve as an intermediary between research organizations and the companies which use the technology. Using research data from these contacts, the center can summarize ongoing projects and anticipate the needs of the manufacturing and service sectors in terms of technology applications. Ultimately, a research-community college-industry alliance is developing, which will produce a defined channel and improved process for increasing productivity.

Six Tennessee two-year colleges are forming this coalition to develop a plan that is producing a framework for identifying and developing emerging engineering technology programs. Components for linkages with industry, other colleges and universities, and secondary schools are important in the project.

Title: Texas Center for the Replication of Excellence in Advanced Technological Education (Texas CREATE)

Steve Rodi DUE 9453257
Austin Community College
Austin, TX 78768
FY1994 $ 48,362
Advanced Technological Education

Leading mathematics, science, and technology educators from Texas are forming a statewide consortium; the Texas Center for the Replication of Excellence in Advanced Technological Education, or Texas CREATE. The consortium has established as long-range goals for this center: to link the consortium state-wide, to establish partnerships in education, industry and government that result in regional science academies, to validate the skills requirements of regional employers, to produce and implement interdisciplinary curricula and methodologies for delivery of instruction in mathematics, science and technology core courses, to produce and implement integrated curricula in environmental technology, to strengthen enrollment, retention and job placement for women and minorities, to establish a network between industry and education that results in internships and cooperative exchanges, and to disseminate the results of the Center's activities.

Texas CREATE anticipates the following activities during the planning year: organization of interdisciplinary teams, commitments from regional partners that will lead to science academies, establishment of the scope of investigation to be performed by the center, development of communication links, brainstorming with partners at regional meetings, development of a canvassing instrument for surveying industries, development, testing and refinement of a format for instructional modules, development of a model for faculty enhancement and teacher training, development of a strategy for recruitment, retention and job placement for women and minorities, recommendation on environmental technology programs, a plan for integrating environmental technology into existing programs, and a model for curriculum development.

More specifically, three teams within the Texas CREATE organization are developing curriculum outlines and model instructional modules as part of the planning grant. The first is a one-semester Introduction to Technology course which integrates fundamental content in mathematics and science with an underlying focus on using laboratory instruments and the acquisition of data gathering skills. Two exemplary learning models, at least one of which has a limited-scale field test, are being written. Each emphasizes small group cooperative learning in a practical, hands-on setting. A second team is outlining a first-semester course in Environmental Technology. One model module in environmental technology, using the same small cohort learning format as the Introductory course, is being developed fully and then field tested. The third team is outlining fully a first-semester Electronics Technology course with important new emphasis on comparison with traditional curricula. A second semester course in Electronics Technology is being outlined (but in less detail) to provide a picture of what will be developed comprehensively in 12 to 16 modules per course.

An important part of the consortium's early work is establishing the electronic communications network which links the consortium members during the development phase of the project and ultimately become the nerve system uniting the components into a Center. This includes sophisticated use of the Internet, specifically World Wide Web and Mosaic, both as an internal means of communication and part of instructional design. In addition, a statewide full-duplex video conferencing network through the Texas Engineering Experiment Station (TEES) is being set up for use in both project development and presentation of instruction.

The Texas CREATE consortium involves six community colleges; Amarillo, Austin, Kingwood-North Harris, Richland-Dallas, San Jacinto and Tyler, and four universities; Prairie View A&M University, Southwest Texas State University, Texas A&M University, and West Texas A&M University.

university faculty; administrators; practicing scientists and engineers; business and industry representatives; community and governmental agencies; and professional organizations.

The following goals form the core initiatives of the South Texas Advanced Technological Education Center: (a) develop model curricula which reflect both integration and application of concepts within the real-life/work-related context of a dynamic global society; (b) establish a faculty enhancement program which provides faculty with development options so that they can become the force behind curricular changes and innovations; (c) create a student outreach and support program which recruits, retains, and supports underrepresented populations for science, mathematics, and technological careers; (d) broaden collaborative endeavors with present partners and increase efforts to forge new regional partnerships; and (e) support a teaching and learning environment which incorporates state-of-the-art equipment for laboratories and multimedia and telelearning technology in the classroom.

Title: South Texas Advanced Technological Education Center

Cecilia V. Gonzales DUE 9454572
Alamo Community College District
San Antonio, TX 78284
FY1994 $ 99,984
Advanced Technological Education

Seven community colleges in South Texas are planning for the development of the South Texas Advanced Technological Education Center in order to implement a new paradigm for teaching and learning.

The project is ensuring an environment which fosters inventive curricular revision and faculty development; increasing the productivity of education and training by using computer-based multimedia and telelearning systems; expanding resources for innovations; empowering all faculty and students to learn how to learn, and expanding collaboration between regional alliances.

The application of the paradigm is being accomplished through a long-term, comprehensive, restructuring process which involves secondary school teachers; two-year and four-year college and

Title: TechQuest: A Center for Advanced Technological Education in Virginia

Michael N. Bishara DUE 9454615
Old Dominion University Research Foundation
Norfolk, VA 23508-0369
FY1994 $ 49,858
Advanced Technological Education

The Virginia Space Grant Consortium (VSGC), in collaboration with the Virginia Community College System (VCCS), 23 community colleges, 3 Space Grant universities, the State Department of Education, and a broad spectrum of business and industry interests, is planning for the development of an Advanced Technological Education Center (TechQuest) for the Commonwealth of Virginia to address the needs of advanced technological education. Through the TechQuest Planning Initiative, the Virginia Space Grant Consortium and its partners is evaluating existing curricula at the community colleges, planning appropriate revision and augmentation of curricula, and developing professional enhancement activities for community college faculty, sec-

ondary teachers and guidance counselors to support this curricular reform for advanced technological education. Commitment to the TechQuest initiative of the VSGC, VCCS administration, higher education, industry, and other partners is very strong. The planning phase for the TechQuest Center is being led by a project director from Southwest Community College; a project manager from VSGC; a steering committee, a team of technical, academic and resource advisors, and planning teams for four Advanced Technological Education strands. These content strands include: core-courses, high performance manufacturing, electronics and environmental technology. The goal of the planning phase is to develop an action plan for the implementation of the TechQuest Center through which extensive curriculum reform will be instituted in Virginia's community colleges along with the proposing professional development strategies to support the renovated curriculum for advanced technological education.

PROJECTS

Title: Image Processing for Teaching: Faculty Development and Curriculum Materials

Melanie Magisos DUE 9454520
Center for Image Processing in Education
Tucson, AZ 85712
FY1994 $403,814
FY1995 $466,493
FY1996 $476,524
Advanced Technological Education

Image Processing for Teaching (IPT) brings a powerful technology to schools and two-year colleges where students use this state-of-the-art tool for exploration and analysis, learning problem-solving skills, computer and imaging technologies, and specific image processing skills which are becoming increasingly important in the modern workplace. IPT's past success at exciting students about science and mathematics, bringing inquiry and discovery-based learning to students of all ability levels, has created considerable demand for implementation in vocational/technological education settings.

The IPT project is producing curriculum materials targeting technological education programs. Workshops are being designed and conducted to provide the faculty development necessary for successful implementation. IPT further supports implementation with follow-up services, including toll-free telephone and e-mail communication, an annual conference, and periodic video conferences. The team of expert teachers play a primary role in all planning, development, and instructional activities. The stream of interdisciplinary activities, keyed to occupational clusters, keeps instructors and their students on the cutting edge of technology, while using a demonstrated powerful tool for learning.

Title: Expanding the Biotechnology Education Program in the San Francisco Oakland Bay Area

David R. Stronck DUE 9454502
California State University Foundation
Hayward, CA 94542
FY1994 $ 250,000
Advanced Technological Education

A program for educating biotechnology technicians is presently operating at Contra Costra Community College, with articulation to Richmond Secondary School. A Tech-Prep grant funded internships at Contra Costra College and local biotechnology firms for secondary school students. This project is assisting science educators and scientists to continue preparing technicians for local biotechnology companies. A three week workshop for 48 teachers and 8 meetings during the academic year are being offered. Mentors make site visits, and telecommunications is being used to implement the program. A biotechnology kit and curriculum are being developed and implementation is planned into many secondary schools with high minority enrollments.

Title: Preserving the Legacy: A Comprehensive Curriculum and Materials Development Project in Support of Advanced Environmental Technology Education

Sally V. Beaty DUE 9454521
Intelecom Intelligent Telecommunications
Pasadena, CA 91105-1937
FY1994 $ 499,988
FY1995 $ 499,989
FY1996 $ 499,989
Advanced Technological Education

This project is developing instructional materials including print and video, laboratory materials, and faculty guides to be used in the education of environmental technicians. The project is being

carried out in cooperation with the Partnership for Environmental Technology Education (PETE) and Van Nostrand Reinhold Publishers. The material to be generated covers eight content areas: (1) Introduction to Environmental Technology; (2) Waste Generation, Reduction, Treatment, and Prevention; (3) Basics of Toxicology; (4) Basics of Industrial Hygiene; (5) Site Characterization, Sampling, and Field Analysis; (6) Environmental and Hazardous Materials Regulations; (7) Contingency Planning and Reporting for Emergency Response; and (8) Safety and Emergency Response.

The primary audiences for the modules are two-year community and technical college students throughout the United States. Linkages are being established, however, which will make *Preserving The Legacy* accessible to secondary school students, as well as students attending four-year colleges and universities.

Title: Advanced Technological Education in Biotechnology: A Community College Partnership with Industry

Jamie Deneris DUE 9454657
Peralta Community College District Office
Oakland, CA 94606
FY1994 $209,073
Advanced Technological Education

This project involves an integrated and vocational enriched program in biotechnology. The program leads to a certificate and associate degree; incorporates basic science, computer use, applied mathematics, reading skills, writing skills, and critical thinking. Committed partnerships include industry, a 2-year college, secondary schools, and government. The project also address the needs of a rapidly changing workforce by reducing barriers for entry of women and minorities into science and mathematics based occupations. New instructional methods are being incorporated into the curriculum, and cooperative learning environments are provided through mentorships and internships with industry.

Title: The Pacific Technological Education Project (PacTEC)

Charlotte Behm DUE 9454513
Mission College
Santa Clara, CA 95070
FY1994 $ 300,000
Advanced Technological Education

Pac-TEC is a consortium of two-year colleges, secondary schools, and businesses situated in the Silicon Valley with regional partnerships in seven western states. This project is developing and distributing state-of-the-art instructional materials and techniques to secondary schools, colleges, industry, and government. These materials focus on innovative mathematics, science, engineering, and technology and are aimed at students who will become technicians. Emphasis is being placed on the development of materials which will enhance students' problem solving abilities, computer literacy, effective oral and written communication skills, and ability to work in groups. The materials are being created around open-ended design based project work.

Title: Environmental Technology Education for Native American Tribal Colleges

Karl F. Topper DUE 9454633
Mesa State College
Grand Junction, CO 81502
FY1994 $ 399,778
Advanced Technological Education

Native American Tribal environments have often historically been neglected; and tribes have inadequate resources and expertise to deal with cleanup and prevention of further pollution. Because tribes need to know how to measure and analyze their own environmental risks, a technologically educated and trained Native American environmental work force is needed.

This project is using existing resources to create and transfer an interdisciplinary environmental technology associate degree curriculum for tribal colleges and other community colleges with roles in educating American Indians. It is also pro-

viding faculty enhancement, instructional materials, and a rotating equipment program. The curriculum focuses on those technologies used for environmental monitoring, site assessment, solid waste management, and pollution prevention because these are the prominent environmental issues facing tribal lands. From incorporation of support disciplines, (mathematics, science, communications), students are developing analytical skills for situations in which they are not specifically trained. Mesa State College, Navajo Community College, and Northern New Mexico Community College are the resource colleges, each with different established environmental technology programs. The pilot group of tribal and tribally related colleges are Navajo Community College, Northern New Mexico Community College, Crownpoint Institute of Technology, and Southwest Indian Polytechnic Institute. The project methodology is interactive, using workshops, site visits, iterative writing/review, and hands-on activities. The tribal colleges are part of the process from the beginning and will take ownership of the curriculum.

Title: Establishing and Transporting: Science, Computer and Electronics Technology to Rural Minority Students through Simulated Laboratories and Telecourses

G. Robert Converse DUE 9454647
University of Hawaii/Maui Community College
Honolulu, HI 96822
FY1994 $499,938
Advanced Technological Education

Maui Community College is establishing and transporting a distance education project that involves teaching science, computer, and electronics technology curricula to rural minority students through interactive teleclass lectures and simulated multimedia laboratory experiences. The first stage of the project encompasses the development of multimedia instructional materials for a model Certificate and Associate in Science Degree curriculum in Electronics and Computer Engineering Technology (ECET). The program is cooperatively designed to provide for technical certification and/or transfer opportunities to baccalaureate degree programs at the University of Hawaii-Manoa or distance education offerings at the Maui Research and Technology Center from the University of New Mexico. The second stage focuses on developing multimedia laboratory exercises for the ECET curriculum in a format transportable to outreach by reducing dependence on costly laboratory equipment and faculty travel. This innovative format utilizes simulated laboratory experiments by developing, purchasing, and integrating multimedia software for CAI workstations. The ECET program is being field-tested on the main campus and then extended to the college outreach centers, and is recruiting students from MCC's densely-populated Pacific Island and Asian community. The third stage is the extension of the simulated methodology to other science and mathematics courses at the college. The final stage involves teacher and faculty enhancement. Effectiveness of this approach is being demonstrated through scheduled workshops for other college instructors state-wide and to secondary school teachers. The project results are being disseminated on a national level.

Title: Use of Gas Chromatography/Mass Spectrometry in Interdisciplinary Technical Education

Lorie Juhl DUE 9451053
Eastern Idaho Technical College
Idaho Falls, ID 83404-5788
FY1994 $ 38,553
Advanced Technological Education

This project introduces students in two technician education programs to gas chromatography/mass spectrometry (GC/MS) through an interdisciplinary environmental monitoring project. In a collaborative study of the Henrys Fork of the Snake River, Chemical Laboratory Technician and Hazardous Materials Technician students analyze water samples for various organic and inorganic constituents using GC/MS, Ion Chromatography (IC), wet chemistry techniques, and field testing equipment. The project requires groups of students to create objectives, identify

and implement procedures, follow protocols that are standard to industry and the Environmental Protection Agency (EPA), and report analysis to selected state and conservation agencies. The GC/MS is used to determine the presence of specific pesticides and volatile organic compounds in the river due to heavy agricultural use in the river's drainage. Availability of a GC/MS allows authentic environmental monitoring following EPA guidelines, acquaints students with a critical analytical tool routinely used in industry, introduces computer operated instrumentation, and provides experience with database searching and quantitative software. The collaborative nature of the project also provides students unique opportunities such as supervising and teaching colleagues in a closely related field and interacting with professional organizations.

Title: Two-Year Associate of Technology Curriculum Development for GIS/GPS Technologies

James L. Keating DUE 9454618
Kansas State University at Salina
Manhattan, KS 66506
FY1994 $ 500,000
Advanced Technological Education

This project is to developing and distributing a curriculum for an associate degree in the fields of Geographical Information Systems (GIS) and Global Positioning Systems (GPS). The projected need for trained GIS and GPS technicians is high because, within the next decade, every plane, ship and almost every vehicle on the highway will use GIS and GPS; and governments will rely on these technologies to track, tabulate, and map environmental census and tax data.

In cooperation with a network of eight community colleges, an innovative curriculum is being planned and tested, which links the environmental, legal, and business experience of the partner colleges with the lead institution's experience in GIS/GPS and engineering technology. The curriculum, and all support materials, are being used as a vehicle to ease articulation between other schools (secondary, two-year and four-year) that are interested in adding GIS/GPS to their curricula. The materials are also being disseminated through national publishers, journals, and a national educational association.

Title: Kentucky Advanced Technological Education Project

Anthony Newberry DUE 9454585
University of Kentucky
Community College System
Lexington, KY 40506
FY1995 $ 800,000
ATE $ 696,300
ILI $ 103,700
Advanced Technological Education

The Kentucky Community College System is establishing computer facilities at each of its fifteen widely separated community college campuses. These new facilities are being utilized for statewide reform of the mathematics algebra-level and calculus which form part of the curriculum for students in Advanced Technological Education programs. The laboratories also support development of new two-year curricula in telecommunications and computer system management. A system of formal courses (taught using satellite facilities) to train faculty and staff to maintain the network system are catalyzing Continuing Education/Community Service programs in the use and administration of network systems, and colleges are developing the capability to offer a new associate degree program in network system administration. At the conclusion of this project approximately 40% of the System's intermediate and college algebra level mathematics courses will be taught as integrated courses in a collaborative learning environment using technology as a learning tool. While 15,000 students across Kentucky are directly benefiting from the revised curriculum during the actual project period, the project will ultimately affect many thousands more students and ordinary citizens.

Title: Hands On Physics: A New Conception of Physics

John G. King DUE 9454575
Concord Consortium
Concord, MA 01742
FY1994 $ 432,743
Advanced Technological Education

Hands-On Physics represents a major reconsideration of introductory physics which takes full advantage of the powerful insights learned about how students learn and the new opportunities technologies offer. The material targets students headed for technological careers at the secondary school and two-year college level. The project is a collaboration between a small central staff and practicing teachers and faculty who are developing, testing, and revising the material in actual classrooms. The Concord Consortium is a collaboration between TERC (Technical Education Research Center), MIT (Massachusetts Institute of Technology) and several community colleges in Massachusetts.

Title: Advanced Biotechnology Education Project

Barry L. Werner DUE 9454642
Middlesex Community College
Bedford, MA 01730
FY1994 $ 347,978
FY1995 $ 392,307
FY1996 $ 392,109
Advanced Technological Education

This project is developing coordinated secondary school and two-year college biotechnology curricula. Supporting activities include teacher and faculty training, industry mentor education, program materials development, job shadowing, and the recruitment and retention of underrepresented groups of students. Principal collaborators include a two-year college, secondary schools, four-year colleges and universities, biotechnological industries and government. Biotechnology programs are being articulated for different educational levels, and major developments include classroom and multimedia materials. Also, developed materials are being disseminated through various media such as publications, videos, electronic linkages, workshops, and conferences.

Title: Math/Science Enhanced Manufacturing Technology Training for Females and Minorities

James Amara DUE 9453921
Minuteman Vocational Technical School
Lexington, MA
FY1994 $ 185,700
FY1996(TE) $ 170,370
Advanced Technological Education

A pilot manufacturing laboratory facility has been established at Minuteman Science and Technology Secondary School. A formal three year curriculum in manufacturing technology is being developed in coordination with Middlesex Community College.

This project is developing over a four year period an integrated manufacturing instructional model for 30 female and minority grades 6-12 teachers. Participants are being introduced to the project via three seminars held in the spring. Seminars are on equity issues and manufacturing technology. Each summer over the life of the project the participants receive an intensive three week workshop on current trends and practices in manufacturing. Topics include: automation, electronics, mechanics, and bio-manufacturing. Emphasis is placed upon the integration of mathematics and science, the importance of communication and human relations, technology skills related to manufacturing, career awareness, and hands-on activities appropriate for junior and senior secondary-school students. Each academic year the original thirty teachers acquire more complex integrated mathematics/science and technology skills coupled with specific workshops on women and minority issues as they begin to develop integrated projects suited to their teaching environment. The project emphasizes a realistic view of science and technology as problem solving activities which require skill in collaboration, experimentation, writing, computing, and the pursuit of exploration.

Title: A Revision of Technical Physics

Robert W. Eshelman DUE 9454620
Henry Ford Community College
Dearborn, MI 48128
FY1994 $ 129,670
Advanced Technological Education

Henry Ford Community College (HFCC) is revising the curriculum of its introductory Technical Physics course, a class required for students in career education programs such as electrical/electronics technology, energy technology, industrial drafting, manufacturing engineering, and robotics. With approximately 200 students enrolled in Technical Physics each year, the College has a significant population for its study.

The revised course incorporates Workshop Physics, technological applications, and Writing Across the Curriculum, and in the process is being aligned with the National Science Education Standards. Working closely with a steering committee comprised primarily of industry representatives, the HFCC project team is determining current technological applications which require the physics which is included in the introductory course. Industry is also contributing to the design of the writing component of the technical physics course, providing samples of technical reports appropriate in the industrial context.

Title: A Revision of Technical Mathematics Based on the National Council of Teachers of Mathematics Standards

Barbara K. Near DUE 9452436
Henry Ford Community College
Dearborn, MI 48128
FY1994 $ 20,063
ILI-Mathematics

Seven years ago the publication of *Toward a Lean and Lively Calculus* (1986) launched a significant reform of the nation's calculus curriculum, however, comparable reform has not been generally introduced in technical mathematics. Technical mathematics is designed for students in associate degree programs such as architectural construction, computer information systems, electrical/electronics technology, energy technology, industrial drafting, manufacturing engineering, and robotics. It is the only college mathematics course taken by approximately 100,000 of the nation's community college students prior to their entry in the workplace.

This project ties in with an award to Henry Ford Community College by Fund for the Improvement of Postsecondary Education (FIPSE) to incorporate the National Council of Teachers of Mathematics (NCTM) Standards in the technical mathematics sequence. Henry Ford Community College's pilot program also creates a context for cooperation between career education faculty and mathematics faculty in the development of applied real-life problems that are being used as activities within the redesigned course. Representatives from companies such as Ford Motor, AC Delco, and Kerr Manufacturing are participating in designing activities that incorporate industrial applications. The activities use computer-assisted programs such as MathCad and Geometer's Sketchpad to encourage students to collect evidence, to problem solve, and to work collaboratively.

Title: Establishing New Technology Education and Rural Area Networks

Chandler H. Stevens DUE 9454551
Minnesota Riverland Technical College
(Austin Campus)
Austin, MN 55912
FY1994 $271,802
FY1995 $228,198
Advanced Technological Education

A two-year project in curriculum and network development undertaken by two two-year colleges (Minnesota Riverland Technical College and Austin Community College) also involves universities and secondary schools; initially Mankato State University and Austin Secondary School. This project focuses on educating builders of information highways and local byways. The focus is on "conets"—cooperative networks that link communities and companies regionally as

well as within evolving national and global information infrastructures.

The last two years of secondary school and last two years of university baccalaureate degrees (in engineering, information science, etc.) provide a "2+2+2" context for developing a two-year associate degree in interactive mass media and networking communications. Students study core, general, and technical courses and then select options—tentatively called digicom (electronics), multiware (computers), and intervision (mass media). Practicums entail student work on development of a "conet" to serve local communities and involve secondary schools as public access sites, equipped with terminals and kiosks.

This two-year project is intended to help set the stage for development of both: 1) CoNet supporting curricula not just within two-year colleges but within "2+2+2" education extensions; and 2) a Southeastern Minnesota CoNet regional community network, as a potential model for rural regions in the United States and globally.

Title: New Hampshire Biotechnology Technician Education and Training

Sonia S. Wallman DUE 9451672
New Hampshire Vocational Technical College–Manchester
Manchester, NH 03102
FY1994 $ 80,000
ILI $ 50,000
ATE $ 30,000
ILI-Life Sciences

This project provides superior instrumentation to educate technicians for emerging high technology biology-based careers in the manufacturing and production phase of the biotechnology industry. The Biotechnology Associate in Science degree, certificate and industry specific training programs offered by the New Hampshire Technical Colleges/Institute are the only programs in the state that educate technicians for entry level employment into the biotechnology industry and for further education at four-year colleges in New Hampshire and other states. The contextual learning that takes place in the cornerstone courses, Biotechnology Experience I and II, is producing technicians that know how to function in the biotechnology industry. The interactive multimedia teaching and independent student learning laboratory facilitates the teaching and learning of conceptually difficult aspects of the practice of biotechnology. The resource center created by the very existence of the biotechnology facility located at NH Technical College at Pease connects students, educators, government, and bioindustry representatives interested in the development of New Hampshire's and New England's biotechnology industry and helps to nurture a seamless infrastructure which provides multiple entrances into and exits from education and jobs in biotechnology.

Title: Industrial Controls Laboratory and Course in Manufacturing Engineering Technology

Melvin Roberts DUE 9454538
Camden County College
Blackwood, NJ 08012
FY1994 $160,000
Advanced Technological Education

An industrial controls laboratory is developing in the Computer Integrated Manufacturing (CIM) Center to support a course in industrial control systems for the CIM curriculum of the Southern New Jersey CIM Consortium (6 county community colleges in addition to New Jersey Institute Technology). This laboratory also supports a similar non-credit short course for manufacturers and a professional development course for educators. The emphasis is on Programmable Logic Controller (PLC) programming and applications to industrial controls. Class notes and laboratory experiments are being developed and made available to the engineering technology community.

Title: Integrating Technical Applications into the Learning of Mathematics: A Collaborative Effort

Reginald K. Luke DUE 9454604
Middlesex County College
Edison, NJ 08818
FY1994 $ 169,813
Advanced Technological Education

This project involves an interdisciplinary development of technical mathematics instructional modules, emphasizing the problem-solving approach; the scientific method; and realistic, real-world problems. Representatives from business and industry, in particular, those from the Princeton Plasma Physics Laboratory, are providing technical and industrial perspectives on scientific and engineering applications. The graphing calculator linked with a portable sensor and probe setup, called the Calculator Based Laboratory (CBL) system, are the technological instructional tools chosen for classroom and laboratory use. Over a two year span a total of 10 curriculum teams, comprised of Middlesex County College mathematics and science/engineering faculty, working cooperatively with teachers from local secondary schools, are producing 30 instructional modules, to be used at the secondary school level as well as in technical college curricula. A series of conferences and workshops are being held to assist participants in mastery of these technological tools, as well as the most effective problem-solving and cooperative-learning strategies. The instructional modules are being disseminated through the Middlesex County College network of local secondary schools, a consortium of regional community colleges, the New Jersey Statewide Systemic Initiative for Improvement of Mathematics and Science, and professional mathematics associations.

Title: Mathematical Sciences and their Applications Throughout the Curriculum

Allan L. Gutjahr DUE 9455985
New Mexico Institute of Mining & Technology
Socorro, NM 87801
FY1994 $ 50,000
ATE $ 25,208
CCD $ 24,792
Mathematics Planning

New Mexico Institute of Mining and Technology (New Mexico Tech), Navajo Community College (NCC), San Juan College (SJC) and Sandia National Laboratories (SNL) are forming a coalition to plan for the development and implementation of innovative approaches to mathematics education across the curriculum. An advisory board with both academic and industrial representation is guiding the program. Faculty from mathematics, physics, geoscience, biology and engineering (materials, electrical, mineral, environmental and petroleum) are developing integrated and coordinated projects. Many of the projects focus on development of mathematics courses that underlie technician and other programs in two-year colleges.

Title: Technology Instruction for the 21st Century

Bernard E. Mohr DUE 9454613
CUNY Queensborough Community College
New York, NY 11364
FY1994 $197,013
FY1995 $192,335
FY1996 $110,652
Advanced Technological Education

Multimedia-based curriculum materials are being developed to support technology education in data acquisition, embedded systems, and multimedia and high speed networks. These materials, which include networked laboratory manuals, text and student exercises, are available in a modular format to facilitate their incorporation into technology education courses at other institutions. A significant evaluation component is included to assess the effectiveness of the multimedia materi-

als, especially with respect to learning outcomes for members of underrepresented groups. Six one-week summer workshops (two each year over a three-year period) are being offered to disseminate products completed in the project and to assist faculty to develop the capability to author effective multimedia-based instructional materials.

Title: Partnership for the Advancement of Chemical Technology (PACT)

Arlyne M. Sarquis DUE 9454518
Miami University Middletown
Middletown, OH 45052
FY1994 $ 400,000
FY1995 $ 400,000
FY1996 $ 400,000
Advanced Technological Education

Miami University Middletown, in partnership with the major chemical industries in Ohio and a regional consortium of two-year and four-year colleges and secondary schools, is establishing a regional consortium for Chemical Technology Education. By bringing academic courses into closer touch with today's industrial chemistry, the project is attracting additional students to careers in chemistry and improving the quality of education of chemical technicians.

Four categories of activities are envisioned for the project: 1) Curriculum Development; 2) Instructional Materials Development; 3) Faculty and Teacher Enhancement; and 4) Student Enhancement and Outreach. Secondary school and college faculty are eligible for a Teacher Industrial Internship Program in which participants spend a summer or part of an academic year working in partner industries. Similarly, master secondary school teachers and two-year college faculty are working in collaboration with industrial chemists in developing curriculum and instructional materials. Symposia and special topic seminars are also being organized on a regular basis.

The project is being built upon the nationally known eight-year old Partners for Terrific Science industrial/academic partnership and programs housed in the Center for Chemical Education at Miami University Middletown, as well as existing collaborative efforts of the consortium members. This project is serving as a model for regional and national development of improved chemical technician education.

Title: The Application-Based, Technology-Supported, One-Track Mathematics Curriculum Program (ATO)

Pamela E. Matthews DUE 9454627
Mount Hood Community College
Gresham, OR 97030
FY1994 $469,923
Advanced Technological Education

The Mt. Hood Community College (MHCC) Mathematics Division is developing, implementing and disseminating a comprehensive Application-based, Technology supported, One-track Mathematics Curriculum for all students (baccalaureate preparation and technical preparation). The four levels of study incorporate the National Council of Teachers of Mathematics Curriculum and Evaluation Standards (NCTM) and the Secretary's Commission on Achieving Necessary Skills (SCANS) recommendations. The curriculum development responds to the education reform movement in mathematics while addressing: the lack of appropriate course materials targeting community college students; the lack of a framework to train adjunct mathematics instructors (on which the community college heavily relies); and, the lack of articulated curriculum for the same level of mathematics taught in middle schools, secondary schools, community colleges and four-year schools.

The following are the three objectives for development and implementation of the Applications, Technology, One-Track (ATO) Program. (1) To develop and publish course materials for Levels II and III (applications oriented algebra) of ATO: a textbook for each level that fully integrates the use of technology; and, a hands-on activities and real-world interdisciplinary applications supplement. (2) To develop a framework for the ongoing staff development of community college adjunct mathematics faculty to enable them to effectively deliver a coherent mathematics curriculum. (3) To

develop in collaboration with middle schools and secondary schools in the community college district an articulated coherent mathematics curriculum that addresses content-based proficiency assessment strategies, and supports uniform implementation of the NCTM Standards in mathematics education.

Methods to accomplish these objectives build on previously-established team efforts at MHCC, partnerships with industry, and collaborative activities with other schools including middle schools, secondary schools, and four-year colleges. The Northwest Regional Educational Laboratory is instrumental in the evaluation of the project, along with the Program Management Evaluation/Assessment Advisory Team.

Title: Advanced Technological Education Programs in Semiconductor Manufacturing

David Hata DUE 9454589
Portland Community College
Portland, OR 97219
FY1994 $ 100,000
FY1995 $ 100,000
Advanced Technological Education

The Portland Community College—Intel Corporation cooperative program in semiconductor manufacturing education is being transported to two other sites: The Southwestern Indian Polytechnic Institute and Albuquerque TVI with Intel and Chemeketa Community College in Oregon with Siltec Silicon. This academic program is characterized by a solid foundation of science, mathematics, and communications skills, along with specialty courses offered using industry facilities. Project activities include curriculum transfer, faculty development, course implementation and updating, instructional delivery, program assessment, and dissemination of project results. A central feature of the project is an annual three-day workshop at which faculty participants collaborate on how courses should be taught, course content and level, student assessment, and specification of best practices identified at the various sites.

Title: Development of Environmental Technology Laboratory and Field Manual

Alfred R. Hoffmann DUE 9452559
Montgomery County Community College
Blue Bell, PA 19422
FY1994 $ 58,600
ILI-Inter/Multidisciplinary

Montgomery County Community College is upgrading its Environmental Technology curriculum and is producing a higher caliber technician and providing continuing education that is resulting in new careers in technologies for a growing unemployed workforce. The program has been developed using DACUM (Develop a Curriculum) from the merging of ideas and experiences of engineers, educators, and technicians in the field. The goal of the curriculum is to give the students a fundamental background in general environmental theory and application of this theory in field and laboratory exercises and analysis. The curriculum emphasizes good field and laboratory techniques, computer-aided data analysis, and both written and oral communication of results. Equipment is being purchased for the field and laboratory courses which are designed to reinforce the environmental principles presented in the lectures. This equipment includes computers, software, and peripherals for performing data analysis and presentation.

Title: A Partnership for Excellence in Engineering Technology Education

Wayne R. Hager DUE 9454547
Pennsylvania State/University Park
University Park, PA 16801
FY1994 $ 282,000
FY1995 $ 376,000
Advanced Technological Education

This project represents a partnership between the York County Area Vocational-Technical School, the York City Schools, Penn State University (at its York, Harrisburg and University Park two-year campuses), regional industry and the Pennsylvania Department of Education. The

partnership is developing a comprehensive model for technological education for 11th grade through the associate degree level with possible extension to the baccalaureate level. The model focuses on manufacturing curriculum and educational processes. It is producing integrated and interdisciplinary modules, teaching materials, and resources for seven courses.

The modules are being developed collaboratively by teachers and faculty. The modules, which focus on technical topics, are being developed within the context of teacher/faculty workshops which include enhanced pedagogical techniques. Use of the modules is reinforcing technical topics within the secondary school curriculum and bringing enhanced teaching techniques to the college curriculum. All educational levels see better integration of topics and understanding of the interdependence of mathematics, science ,and technology.

The project anticipates substantial dissemination to secondary and postsecondary faculty at other Penn State locations, and to faculty across the state and nation. The project plan capitalizes on and integrates a variety of current efforts to coordinate technological education in the state and region.

Title: Industry-Academia Partnership Project: Computerized and Electronics Programs Improvements for High Risk Minority Students for Retention/Improved Employment Opportunities

Felix Rodriquez Matos DUE 9454640
Huertas Junior College
Caguas, PR 00726
FY1994 $50,000
Advanced Technological Education

This project aims to develop a sustainable and replicable industry-academic partnership model for advanced technological education to demonstrate how such partnerships improve retention and employment outlook of high risk Hispanic students in computerized drafting and electronics programs.

This partnership project is: (1) placing students and recent graduates in related industries to provide job experience through internships, (2) including a counseling component based on Total Quality Management (TQM) concepts applied by industry, (3) providing job-related educational experiences to additional students through visits to industries including oral/written visit preparation exercises, visit observation guides and, post-visit reports; (4) providing opportunities in industries for the professional development of faculty resulting in course content/instructional materials preparation/modification to integrate classroom learning to industry practices, and (5) providing teaching experience to alumni who provide follow-up to internship participants.

Industries provide mentors who assist faculty in their professional development, make suggestions for instructional materials, provide group orientations related to industry-specific applications of electronics or computerized drafting, and serve as mentors to the students. A Board of Consultants, including industry members, oversees project implementation.

Title: Establishment of an Instrumentation Calibration Laboratory

Ron Ingle DUE 9454536
Piedmont Technical College
Greenwood, SC 29646
FY1994 $123,904
Advanced Technological Education

This project is creating an instrumentation calibration curriculum strand for engineering technology, technician and science students. The curriculum focuses on a dedicated laboratory consisting of three independent but integratable modules providing hands-on experience with equipment measuring: (1) voltage, current, resistance, and power; (2) fluid flow, and (3) pressure, temperature, and volume. The resultant curriculum consists of ten modified or new courses affecting 16 engineering technology and science faculty and is being offered to students in seven different majors. It is affecting, both directly and indirectly, area secondary school students and two-year college students statewide. It is produc-

ing a replicable model for how two-year colleges can adequately produce the type of broadly-educated technician needed to lead in instrumentation calibration design and operation in high-performance industries.

Title: Interactive Multimedia Instruction for Advanced Instrumentation Technology

Kenneth Sweeney DUE 9454508
Alvin Community College
Alvin, TX 77511
FY1994 $ 247,823
Advanced Technological Education

Interactive multimedia instruction (IMI) is known to be an effective method of delivering technical skill instruction to learners across many educational areas. This project merges the Instrument Society of America's INVOLVE IMI system with the current Electronics program to provide a specialized Associate of Applied Science instrumentation curriculum. The principal aims of the project are to increase the number of instrumentation career seekers, to build education pathways from secondary schools through four-year and higher education in partnership with industry, and to educate a more culturally-diverse and gender-balanced work force and improve learning efficiency. The project is producing highly skilled individuals able to track the process control industry's transition into the evolving automated workplace of tomorrow.

Title: Technical Sciences Academy Proposal

Therese A. Jones DUE 9454651
Amarillo College
Amarillo, TX 79178
FY1994 $ 630,000
Advanced Technological Education

This project is creating a Technical Science Academy as a division within the Amarillo Scientific Arts Academy. The Academy serves secondary and post-secondary students from Amarillo and the surrounding area through state-of-the-art curricula and laboratories in mathematics, science and technology. The project is providing a hands-on curricula for majors in Electronics Engineering Technology and Hazardous Materials Technology. The project implements a seamless educational strand which removes barriers between secondary and post-secondary levels. Team teaching, proficiency based curricula and cooperative learning are the major emphasis of the project, as well as the implementation of internships, cooperatives and interactions with industrial partners for faculty and students. The project is appealing to underrepresented groups including women and minorities. This project grew out of a committee effort which brought together educators and business/industry leaders to generate realistic ways to address national education goals.

Title: Advanced Technical Education (ATE) Alliance

James A. Jordan DUE 9454655
Consortium for Advanced Manufacturing International (CAM-I)
Arlington, TX 76011
FY1994 $ 499,950
FY1995 $ 499,950
FY1996 $ 499,950
Advanced Technological Education

This project is developing, delivering, and evaluating a national curricula to educate technicians who will be employable in 21st century manufacturing enterprises. Instructional delivery is being assisted by distance learning technology and the National Information Infrastructure. Added funding comes from local, state, and other federal sources. CAM-I is leading an Advanced Technical Education (ATE) Alliance, including as members Lawrence Technological University, C.S. Mott Community College, and the Goodrich, Michigan area schools, and affiliates from other school districts in the Flint, Michigan area, clusters of community colleges, school districts, and CAM-I company members in Oak Ridge, Tennessee; Kansas City, Missouri and Kansas,

Los Angeles, California, as well as the Mescalero Apache Reservation NM, Lehigh University and National Technological University.

The knowledge and skill needs for a new breed of agile technicians, able to respond knowledgeably, effectively, and quickly in highly competitive, rapidly changing global manufacturing, are being addressed. The ATE Alliance is meeting these needs by combining existing best practices modules, already developed by its members and affiliates, with newly developed modules in an integrated, flexible, grade 11–14 program in mathematics, science, communications, computing, and manufacturing enterprise technologies in a pilot program centered at C.S. Mott Community College and Goodrich Michigan area schools.

The Alliance is sharing the modules using nationally scalable distance learning techniques. The curricula are being reinforced with teacher training, jobsite education for teachers and students, and public information programs. The ATE Alliance is establishing a virtual school, combining a national network of educational resources to provide locally and temporally optimized education for employability. The pilot curriculum modules are being disseminated via distance learning techniques to the members and the affiliated Associate degree granting institutions and school districts. The curricula is being evaluated through performance based assessment. Successful modules are being further disseminated throughout the United States by CAM-I in publications, public forums, and through CAM-I's national network of industrial members. The ATE Alliance provides 21st-century education in clusters with large, diverse minority populations, preparing students for employment in challenging and rewarding careers.

Title: A Consortium for the Development of Advanced Manufacturing Education

Bartlett M. Sheinberg DUE 9454569
Houston Community College
Houston, TX 77270
FY1994 $ 304,000
FY1995 $ 300,000
Advanced Technological Education

The primary purpose of this project is to create a model technology educational program beginning with one selected discipline and adapting it to other engineering technologies. The project is creating a model of collaboration between secondary schools, two-year and four-year colleges, educational and work force agencies, professional organizations, and private industry.

This project involves an informal consortium between Houston's Spring Branch Independent School District, the Northwest College of the Houston Community College System, the College of Technology of the University of Houston, and selected private industry partners.

The project encompasses: 1) a needs assessment of industrial educational and training requirements, 2) curriculum development at the secondary, community college, and four-year college levels; 3) faculty/student development through educational and industry mentor/apprenticeship opportunities, and 4) and evaluation of the projects performance.

Title: Biomedical Electronic Engineering Technology Project

Reddy Talusani DUE 9454531
Houston Community College
Houston, TX 77270
FY1994 $ 49,963
Advanced Technological Education

This project addresses the critical regional need of the medical community and medical industry for well-educated biomedical electronic technicians by developing enhanced activities for an existing Biomedical Electronic Engineer

Technology program. The development effort specifies an interdisciplinary curriculum to assure that students acquire strong mathematics, science, computer, telecommunications, and other critical thinking skills as part of their degree program. The project encompasses planning for curriculum development, faculty enhancement, and laboratory improvement and establishes a stronger partnership with the medical community and industry to increase internship and co-op opportunities. In addition, the project addresses articulation arrangements with secondary schools, other two-year and four-year colleges.

Title: Technology for all Americans

William Dugger DUE 9355826
International Technology Education Association (ITEA)
Reston, VA 22091-1502
FY1994 $ 500,000
IMD $ 425,000
ATE $ 75,000
Advanced Technological Education

Standards for technology education are needed to complement the national standards in mathematics and science. The first phase of the project is to articulate a rationale and structure for technology education—a vision for the intellectual domain for technology education and its interface with science and mathematics. The International Technology Education Association (ITEA) is developing the document and the processes for evaluating it to gain consensus and acceptance by the technology education community and other constituencies. An Advisory Board of people with national reputations in various fields is overseeing the process.

Title: A Model Rural Appalachian Partnership to Improve Technology Education through Faculty Enhancement and Curriculum Development Activities

Gary T. Laing DUE 9454577
Wytheville Community College
Wytheville, VA 24382
FY1994 $ 197,873
Advanced Technological Education

This project is designed to significantly improve the quality of technological education in Southwest Virginia by increasing the capability of five community colleges to respond to industry-identified needs for advanced manufacturing technology (AMT) education. The project activities serve as a model for rural appalachian colleges and are coordinated through the Southwest Virginia Advanced Manufacturing Center, formed through the consortium of five community colleges. The project involves two components: 1) enhancement of faculty skills and knowledge to teach the advanced technologies required by AMT curricular courses via "back-to-practice" internships in industry and attendance at seminars and workshops, and 2) initial development of common AMT curricular courses by cross-disciplinary teams, comprised of faculty from the five participating community colleges, representatives from regional business and industry, and faculty from area secondary schools and four-year institutions.

Title: Science Technology: Knowledge and Skills

David K. Lavallee DUE 9454564
American Chemical Society (ACS)
Washington, DC 20036
FY1994 $ 500,000
FY1995 $ 500,000
FY1996 $ 500,000
Advanced Technological Education

The Science Technology: Knowledge and Skills curriculum project, (SciTeKS), fills the void of science-oriented technical courses in Tech Prep and similar school-to-work transition secondary school programs. The project is designed to develop printed and multimedia student and teacher materials for large context modules involving chemistry, biology, and earth/space sciences. The development includes curriculum design recommendations and models, multimedia instructional and reference materials for students, suggestions and models for implementation, support for teachers, and guidance for assessment. The curriculum is designed to develop in secondary school students skills in teamwork, problem solving, communication, and other capabilities considered critical for their success in the workplace and/or in further education. The SciTeKS project provides a two-year science curriculum for a variety of school-to-work programs. Students completing SciTeks are ideally prepared to enter immediate employment or college technician programs based on biology, chemistry, or earth/space sciences. The pedagogical strategies are being developed by a team of secondary school, college, and industrial participants.

Title: An Advanced Biotechnology Education Partnership Program

Joy A. McMillan DUE 9454555
Madison Area Technical College
Madison, WI 53703
FY1994 $ 400,000
FY1995 $ 400,000
FY1996 $ 200,000
Advanced Technological Education

The goal of the proposed project is to provide skilled employees for the biotechnology industry. To achieve this goal, a collaboration is being established between the Biotechnology Laboratory Technician Program at Madison Area Technical College, the University of Wisconsin Teacher Enhancement Program, and the industry-based BioPharmaceutical Technology Center Institute. This project is a well-coordinated, highly integrated effort to: (1) develop and disseminate curriculum materials specifically designed for technician training at the two-year associate degree level; (2) provide teacher enhancement activities in biotechnology including summer institutes, mentoring and curriculum development partnerships for associate degree and secondary level school teachers; and, (3) support the development and coordination of industry-led, statewide programs to offer work-based experiences for secondary school students. The program links together the development of instructional materials with faculty enhancement, student laboratory experiences, and school-to-work initiatives.

SUPPLEMENTAL GRANTS

Title: Curriculum and Pedagogy Standards for Two-Year College and Lower Division Mathematics

Marilyn Mays
DUE 9443721
AMATYC
FY1994 $ 10,200
Memphis, TN 38134
Advanced Technological Education

The recent focus in the mathematical community on calculus and the development of the NCTM Standards for K-12 teachers is providing a framework to consider mathematics courses taught at two-year colleges and lower division mathematics courses taught at other institutions of higher education in this country. These courses are important elements in continuum and pipeline issues, as well as general mathematical needs of students not continuing in mathematically oriented fields of studies. The American Mathematical Association of Two-Year Colleges (AMATYC) is undertaking a leadership role in designing a framework for systemic reform of college mathematics in the curriculum leading to calculus. The first stage is a meeting of an AMATYC National Steering Committee consisting of leaders of AMATYC, MAA, and NCTM as well as others actively involved in the development of innovative mathematics curricula and Standards. In the second stage a small invited conference of a National Task Force is being held to establish guidelines for the development of a set of Standards for two-year college and lower division mathematics and to formulate a plan to build consensus for mathematics reform among two-year college and university constituencies.

The AMATYC Standards Project is designed to plan, write and disseminate standards for curriculum and pedagogy for two-year college and other lower division undergraduate mathematics courses; in particular, mathematics courses below the level of calculus are being addressed. This project is filling an important need, serving as a connecting bridge between the NCTM Standards, related projects at the secondary school level, and the reform efforts in calculus at the college level.

This supplement is allowing for a final revision of the Standards document based on input from the community, the hiring of a professional editor to edit the document for consistency of style and distribution of the document throughout the broader community. Because a major emphasis in the document is mathematics for the technical workforce, a special emphasis in the supplement to the project is the involvement and dissemination of the product to those who teach technical mathematics courses.

SUPPLEMENT OF AN OUTREACH GRANT

Lynn Barnett
American Association of Community Colleges
FY1994 $ 19,000
Washington, D.C
Advanced Technological Education

This supplement is designed to augment an outreach grant to the American Association of Community Colleges (AACC) for faculty development and dissemination for the ATE program. In particular these funds are augmenting a previous grant to allow AACC in conjunction with the NSF to host a preconference leadership meeting and a FY1994 ATE principal investigator's meeting. The workshops focus on developing a vision for the future of technological education. The overall issue addressed is: "Building and implementing a program to impact and shape the quality of the technological workforce." The purpose of the preconference workshop which brings together 20 to 25 national leaders of industry, government and education, is to focus on critical issues related to advanced technological education; to develop a vision for the future of technological education; and to discuss how the NSF's ATE program can impact and improve technician education at the National level. The principal investigator's (PI) conference lump together the PI's from FY94 awarded Centers and Planning Grants for Centers, as well as those from the large curriculum projects.

ADVANCED TECHNOLOGICAL EDUCATION PROGRAM
FY1994 Awards

DIVISION OF UNDERGRADUATE EDUCATION
and
The DIVISION of ELEMENTARY, SECONDARY, and INFORMAL EDUCATION

ARIZONA

Image Processing for Teaching: Faculty Development and Curriculum Materials
Center for Image Processing in Education
Tucson, AZ 85712
Award # 9454520

Project
Melanie Magisos
$403,814 ($1,346,831)

MATEC–Maricopa Advanced Technological Education Center
Maricopa County Community College District
Tempe, AZ 85281
Award # 9454545

Planning Grant
Alfredo G. de los Santos
$49,993

CALIFORNIA

Expanding the Biotechnology Education Program in the San Francisco/Oakland Bay Area
California Sate University Foundation Inc.
Hayward, CA 94542
Award # 9454502

Project
David R. Stronk
$250,000

Preserving the Legacy: A Comprehensive Curriculum and Materials Development Project in Support of Advanced Environmental Technology Education
Intelecom Intelligent Communications
Pasadena, CA 91105-1937
Award # 9454521

Project
Sally V. Beaty
$499,988 ($1,499,966)

Planning Grant for an Advanced Biotechnology Education Center
MiraCosta College
Oceanside, CA 92056
Award # 9454512

Planning Grant
Leslie J. Snider
$48,564

MATE–Monterey Advanced Technological Education
Monterey Peninsula Unified School District
Monterey, CA 93942
Award # 9454567

Planning Grant
Kam Matray
$50,000

Advanced Technological Education in Biotechnology: Community College Partnership with Industry
Peralta Community College District Office — Project
Oakland, CA 94606 — Jamie Deneris
Award # 9454657 — $209,073

PacTec–The Pacific Technological Education Project
West Valley Community College System — Project
Saratoga, CA 95070 — Charlotte Behm
Award # 9454513 — $300,000

COLORADO

Environmental Technology Education Transfer to Native American Tribal Colleges
Mesa State College — Project
Grand Junction, CO 81502 — Karl F. Topper
Award # 9454633 — $399,778

FLORIDA

National Center for Excellence in Advanced Technological Education
Presented by Community College for Innovative Technology Transfer (CCITT)
Brevard Community College — Planning Grant
Cocoa, FL 32922 — Maxwell C. King
Award # 9454637 — $50,000

HAWAII

Establishing and Transporting: Science, Computer and Electronics Technology to Rural Minority Students through Simulated Labs and Telecourses
Maui Community College–University of Hawaii — Project
Honolulu, HI 96822 — G. Robert Converse
Award # 9454647 — $499,938

IDAHO

Use of Gas Chromatography/Mass Spectrometry in Interdisciplinary Technical Education
Eastern Idaho Technical College — Project
Idaho Falls, ID 83404-5788 — Lorie Juhl
Award # 9451053 — $38,553

IOWA

ATEEC–Advanced Technological Education Environmental Education Center
Hazardous Materials Training and Research Center — Center
Cedar Rapids, IA 52406 — Ellen Kabat
Award # 9454638 — $999,961 ($2,999,866)

North Central Center for Advanced Engineering Technology Education–NDE/NDT
Iowa State University — Planning Grant
Ames, IA 50011 — David K. Holger
Award # 9454606 — $50,000

KANSAS

Two-Year Associate of Technology Curriculum Development for GIS/GPS Technologies
Kansas State University — Project
Manhattan, KS 66506 — James L. Keating
Award # 9454618 — $500,000

KENTUCKY

Kentucky Advanced Technological Education Project
Kentucky Community College System — Project
Lexington, KY 40506 — Anthony Newberry
Award # 9454585 — $696,300

MARYLAND

Mid-Atlantic Center for Advanced Technological Education
Montgomery College — Planning Grant
Takoma Park, MD 20912 — O. Robert Brown
Award # 9453250 — $50,000

MASSACHUSETTS

Hands-On Physics: A New Conception of Physics
Concord Consortium — Project
Concord, MA 01742 — John G. King
Award # 9454575 — $432,743

Advanced Biotechnology Education Project
Middlesex Community College — Project
Bedford, MA 01730 — Barry L. Werner
Award # 9454642 — $347,948 ($1,132,394)

Math/Science Enhanced Manufacturing Technology Training for Females and Minorities
Minuteman Vocational Technical School — Project
Lexington, MA — James Amara
Award # 9453921 — $185,700

MICHIGAN

A Revision of Technical Physics
Henry Ford Community College — Project
Dearborn, MI 48128 — Robert W. Eshelman
Award # 9454620 — $129,670

A Revision of Technical Mathematics Based on the National Council of Teachers of Mathematical Standards
Henry Ford Community College
Dearborn, MI 48128
Award # 9452436

Project
Barbara K. Near
$20,063

Planning Grant for SMARTE—the Southeast Michigan Alliance for Reinvestment in Technological Education Center
Wayne State University
Detroit, MI 48202
Award # 9454660

Planning Grant
Mulchand S. Rathod
$50,000

MINNESOTA

Establishing New Technology Education and Rural Area Networks
Minnesota Riverland Technical College (Austin Campus)
Austin, MN 55912
Award # 9454551

Project
Chandler H. Stevens
$271,802 ($500,000)

NEBRASKA

A Center of Excellence for Chemistry-Based Technician Education
Southeast Community College
Lincoln, NE 68520
Award # 9453243

Planning Grant
John V. Kenkel
$49,983

NEW HAMPSHIRE

New Hampshire Biotechnology Technician Education and Training
New Hampshire Vocational Technical College–Manchester
Manchester, NH 03102
Award # 9451672

Project
Sonia S. Wallman
$80,000

NEW JERSEY

Industrial Controls Laboratory and Course in Manufacturing Engineering Technology
Camden County College
Blackwood, NJ 08012
Award # 9454538

Project
Melvin Roberts
$160,000

New Jersey Consortium for Advanced Technological Education Planning Projects
Middlesex County College
Edison, NJ 08818
Award # 9453258

Planning Grant
John Bakum
$49,968

Integrating Technical Applications into Learning of Mathematics A Collaborative Effort
Middlesex County College
Edison, NJ 08818
Award # 9454604

Project
Reginald K. Luke
$169,813

NEW MEXICO

Mathematical Sciences and their Applications Throughout the Curriculum
New Mexico Institute of Mining and Technology — Project
Socorro, NM 87801 — Allan L. Gutjhar
Award # 9455985 — $50,000

NEW YORK

Planning Grant for a National Center of Excellence for Advanced Technological Education
CUNY NYC Technical College — Planning Grant
Brooklyn, NY 11201 — Charles W. Merideth
Award # 9453260 — $50,000

Technology Instruction for the 21st Century
CUNY Queensborough Community College — Project
New York, NY 11364 — Bernard E. Mohr
Award # 9454613 — $197,013 ($500,000)

OHIO

PACT–Partnership for the Advancement of Chemical Technology
Miami University–Middletown — Project
Middletown, OH 45052 — Arlyne M. Sarquis
Award # 9454518 — $400,000 ($1,200,000)

National Center of Excellence for Advanced Manufacturing
Education (NCE/AME)
Sinclair Community College — Center
Dayton, OH 45402 — David T. Harrison
Award # 9454571 — $1,000,000 ($3,000,000

OREGON

Northeast Regional Center for Sustainable Resources
Chemeketa Community College — Planning Grant
Salem, OR 97309 — Wynn W. Cudmore
Award # 9453262 — $47,520

ATO–The Application-Based, Technology-Supported, One-Track Mathematics Curriculum Program
Mount Hood Community College — Project
Gresham, OR 97030 — Pamela E. Mathews
Award # 9454627 — $469,923

Advanced Technological Education Programs in Semiconductor Manufacturing
Portland Community College — Project
Portland, OR 97219 — David Hata
Award # 9454589 — $100,000 ($200,000)

PENNSYLVANIA

Development of Environmental Technology Laboratory and Field Manual
Montgomery County Community College — Project
Blue Bell, PA 19422 — Alfred R. Hoffman
Award # 9452559 — $58,600

A Partnership for Excellence in Engineering Technology Education
Pennsylvania State University–University Park — Project
University Park, PA 16801 — Wayne R. Hager
Award # 9454547 — $282,000 ($658,000)

PUERTO RICO

Industry-Academia Partnership Project: Computerized and Electronics Programs Improvements for High Risk Minority Students Retention/Improved Employment Opportunities
Huertas Junior College — Project
Caguas, PR 00726 — Felix Rodriguez Matos
Award # 9454640 — $50,000

SOUTH CAROLINA

Establishment of an Instrumentation Calibration Laboratory
Piedmont Technical College — Project
Greenwood, SC 29646 — Ron Ingle
Award # 9454536 — $123,904

South Carolina Center of Excellence in Advanced Technological Education
Tri-County Technical College — Planning Grant
Pendleton, SC 29670 — James C. Wood
Award # 9454654 — $50,000

TENNESSEE

Planning a Center for the Advancement of Emerging Technology Applications
Chattanooga State Technical Community College — Planning Grant
Chattanooga, TN 37406 — James L. Barrott
Award # 9454648 — $50,000

Curriculum and Pedagogy Standards for Two-Year College and Lower Division Mathematics
AMATYC — Project
Memphis, TN 38134 — Marilyn Mays
Award # 9443721 — $10,200

TEXAS

South Texas Advanced Technological Education Center
Alamo Community College District — Planning Grant
San Antonio, TX 78284 — Cecilia V. Gonzales
Award # 9454572 — $99,984

Interactive Multimedia Instruction for Advanced Instrumentation Technology
Alvin Community College — Project
Alvin, TX 77511 — Kenneth Sweeney
Award # 9454508 — $247,823

Technical Sciences Academy Proposal
Amarillo College — Project
Amarillo, TX 79178 — Therese A. Jones
Award # 9454651 — $630,000

Texas CREATE–Center for the Replication of Excellence in Advanced Technological Education
Austin Community College — Planning Grant
Austin, TX 78768 — Stephen Rodi
Award # 9453257 — $48,362

Advanced Technical Education (ATE) Alliance
Consortium for Advanced Manufacturing International — Project
Arlington, TX 76011 — James A. Jordan
Award # 9454655 — $499,950 ($1,499,850)

A Consortium for the Development of Advanced Manufacturing Education
Houston Community College — Project
Houston, TX 77270 — Bartlett M. Sheinberg
Award # 9454569 — $304,000 ($604,000)

Biomedical Electronic Engineering Technology Project
Houston Community College — Project
Houston, TX 77270 — Reddy Talusani
Award # 9454531 — $49,963

Southwest Center for Advanced Technological Education
Texas State Technical Institution at Sweetwater — Center
Sweetwater, TX 79556 — Robert L. Musgrove
Award # 9454643 — $565,872 ($1,711,637)

VIRGINIA

TechQuest: A Center for Advanced Technological Education in Virginia
Old Dominion University Research Foundation — Planning Grant
Norfolk, VA 23508-0369 — Michael N. Bishara
Award # 9454615 — $49,858

Technology for All Americans — (Other funding from IMD)
International Technology Education Association (ITEA) — Project
Reston, VA 22091-1502 — William Dugger
Award # 9355826 — $75,000 (ATE)

A Model Rural Appalachian Partnership to Improve Technology Education through Faculty Enhancement and Curriculum Development Activities
Wytheville Community College
Wytheville, VA 24382
Award # 9454577

Project
Gary T. Laing
$197,873

WASHINGTON D.C

Science Technology: Knowledge and Skills
American Chemical Society
Washington, DC 20036
Award # 9454564

Project
David K. Lavallee
$500,000 ($1,500,000)

WISCONSIN

An Advanced Biotechnology Education Partnership Program
Madison Area Technical College
Madison, WI 53703
Award # 9454555

Project
Joy A. McMillan
$400,000 ($1,000,000)

1994 ATE Awards—58 Proposals were awarded:
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